

REVIEW ARTICLE

Mechanical profiles of murder and murderers: An extensive review

Mohammad Rahim KAMALUDDIN *PhD*, Nadiah Syariani MD SHARIFF* *MSc* and Geshina Ayu MAT SAAT** *PhD*

*Psychology and Human Well Being Research Centre, Faculty of Social Sciences and Humanities, Universiti Kebangsaan Malaysia, 43600 Bangi, Selangor, Malaysia, *Forensic Science Programme, Department of Diagnostic and Allied Health Sciences, Faculty of Health and Life Sciences, Management and Science University, 40100 Shah Alam, Selangor, Malaysia and **Forensic Science Programme, School of Health Sciences, Universiti Sains Malaysia, 16150 Kubang Kerian, Kelantan, Malaysia*

Abstract

Introduction: Murder is an extreme form of violent crime which occurs across all social, cultural, and ethnic spheres. It is therefore, crucial to understand the nature and the extent of mechanical profiles of murder and murderers. The purpose of this article is to review such critical aspects of murder in a nutshell. **Methods:** An archival research methodology was employed in this study where relevant search for literatures on these mechanical aspects related to murder was made across search engines such as Google Scholar and Elsevier with relevant articles selected for this review. **Results and Discussion:** This review discusses in an in-depth manner, pivotal mechanical profiles which include motives, methods of killing, choice of weapon, settings, targeted body parts, and murder victim concealment. In-depth understanding of each mechanical aspect offers an opportunity to the public at large to expand their knowledge on murder prevention manners which is vital for crime prevention efforts in the future.

Keywords: Homicide, murder, mechanical profiles, offender, victim

INTRODUCTION

Murder is an unlawful act with the intention of killing a person.¹ It is the most extreme form of violence² and the highest level of aggression found in all cultures.³ Strikes by such heinous waves across the globe, provokes worries among public members as to their safety and murder continues to be viewed as the most perplexing problem in the society. As a result, violent crimes like murder receive a disproportionate amount of media attention, greatly affecting the public's perceptions on crime, their fear of crime and public policy.

In this review article, the term 'mechanical profile' operationalised as a collective term to indicate several aspects of murder committed by murderers such as motives, methods of killing, choice of weapon, settings, targeted body parts, and murder victim concealment. The term 'mechanical profile' was earlier used by Geberth⁴ to address motives, methods, wound

structures, crime scene construction, the cause, manner and time of death. According to Geberth⁴, such aspects are important as they provide clues pertaining to the event. In this current review, mechanical aspects of murder committed by murderers will be microscopically explored in order to get an improved idea and understanding of such aspects.

It is a common practice that the term murder and homicide are used interchangeably, although the two words are distinct from each other.¹ Alvarez and Bachman¹ clarified such doubt, where they addressed homicide as a common term for the killing of a human being. Meanwhile, murder in its respective term defines the specific legal category of criminal homicide of a state or country. Since the terms murder and homicide are used interchangeably in many violence and criminological literatures, the entire article employs the term murder and homicide interchangeably for narrative purposes. Through this article, it is anticipated that the

many key personnel in criminal justice figures and forensic pathologists would get benefit and equipped themselves with substantial amount of knowledge on mechanical profiles of murder and murderers.

MATERIALS AND METHODS

The present study was based on desk research. This review employed archival research methodology using available articles on mechanical profiles of murder and murderers. For identifying articles that focused on these mechanical aspects, the terms such as 'motives', 'methods of killing/ killing methods', 'choice of weapon/ murder weapon', 'targeted body parts/ inflicted body parts', 'place/ time settings' and 'victim concealment' were used. These terms were searched with the relation of other terms such as 'murder', 'homicide', 'murderers' and 'homicide offenders'. In addition, snowball search method⁵ was also employed in order to retrieve more related articles that were used as reference in one particular article.

All the articles were searched using several databases such as Google Scholar and Elsevier. A large number of related articles were identified and retrieved from search engines which include review articles, letters to editors and original articles as well as empirical and cohort studies articles that focused on these mechanical aspects of murder and murderers. In addition, the information for the current review also collated from other sources such as books, portfolios, scholarly bulletins and newspapers.

Collating information from various sources ensure the rigour and richness of information on the topic of interest. All of the articles retrieved as well as the information collected from other sources were carefully refined and explored. The most relevant and informative articles were chosen for this current review. The articles and sources that was scrutinised in this review were from the time period of 1979 until 2017.

RESULTS

The in-depth review on the mechanical profiles of murder and murderers are presented as the following sub-sections.

Motives for murder

According to Edirisinghe and Kitulwatte², the motive for a murder differs for each country and region. The question of motive for a murder is always a central and key element to legal

investigations. Motive, from the view of the offender is defined as the perceived, apparent or claimed reasons, or rationale for the commission of the crime.⁶

Numerous studies have been carried out in an attempt to classify the motives for murder. Morall⁷ presented four clusters of murder motives namely: lust, love, loathing, and loot. Other classifications were also documented in the criminological literatures. For example, Douglas *et al.*⁸ suggested four types of motivation-based homicide. These are: criminal enterprise homicide, personal cause homicide, sexual homicide, and group cause homicide.⁸ The subclasses for each type range from the individual to collective acts of murder and from instrumental and expressive motivation type of murder.

Despite of various classifications, most of the criminologists agree on two umbrella categories. Motives of murder have been categorised as either instrumental or expressive.⁹⁻¹⁰ Block and Block⁹ defined expressive murders as a result of expression, emotions, and psychological states. Emotional states like anger, frustration, and hostility are said to lead an individual to perform expressive murders.

Instrumental murders are performed for some benefits such as financial gain, power, and wealth status.⁹ This assertion was supported by Morall⁷ in which instrumental motivation is intended to make a gain for the offender, either in terms of material or social status. Examples of instrumental motives are desire for financial gain, control over the victim, and rape-cum murder. The usage of instrumental-expressive motives in homicide or murder cases is well noted across the classical criminological studies.¹¹⁻¹³ Furthermore, this instrumental and expressive theme was supported by Decker¹⁰ where the researcher addressed motives as dichotomies which have been conceptualized as either instrumental or expressive. Distinctions of the type of murder are made either after the act itself or are generated following statements and confessions by the murderers themselves.

A number of growing literatures^{10,14-17} revealed the association between motives of murder and the relationships between a murderer and a victim. Previous literatures¹⁷⁻¹⁹ connected motives with victim-offender relationship where primary homicides are the end product of expressive motives. Meanwhile, homicides that occur within secondary relationship are presumed to have instrumental motives which

are committed for certain benefits.^{13,17,20}

Previous studies^{16-17,19,21-22} found that expressive violence is concentrated in more intense (primary) relationship which is believed to be caused by expression and emotional states (e.g., anger, hostility, rage, and jealousy). Instrumental violence (e.g., robbery, power status, and profits) appears to be dominant in secondary relationship (such as friends, acquaintances, and strangers).

Methods of killing

What is a murderer's favourite method of finishing off a victim? In order to answer such question, this section focuses on the common types of methods used by murderers from all over the world. In countries where firearm legislation is less benevolent, gunshot homicides predominates.²³⁻²⁵ Deaths by blunt force and sharp force trauma, asphyxia, burning, and beating are more common in countries with more stringent laws on firearm ownership.

In Malaysia, blunt and sharp force trauma predominates as the most common method in homicide.²⁶⁻²⁷ A recent study by Mohammad Rahim *et al.*²⁸ indicated stabbing method as the common killing method among Malaysian male murderers. In addition, a five year (2007 - 2011) retrospective study on murder and murder victims in Peninsular Malaysia indicated sharp force trauma (30.1%) were the most preferred killing methods.²⁹ A similar scenario was noted in India and northern Portugal, involving the elderly.³⁰⁻³²

Based on mechanical profiles of Malaysian male murderers, it was understood that majority of murderers used a single method of killing and very few of them used multiple killing methods. The use of multiple killing methods was noted among 11.3% of total murders.²⁸ According to the study, the use of multiple method of killing was evident in 'premeditated' murders compared to 'spontaneous or passion' murders. This is in order to ensure that murder is successful.²⁸

Killing partners by means of strangulation occur in a substantive number of cases of attempted or completed spousal homicide of women.³³⁻³⁴ Most perpetrators had used their bare hands while some used a ligature to ensure the death of the intended victim as a direct result of asphyxiation.³⁵ Feminist scholars viewed the killing as an extension of men's attempts in order to dominate and control their intimate partners since it is the ultimate and final restriction of one's freedom.³⁶⁻³⁷

Fatal blunt force trauma is commonly

observed in child murder.³⁸⁻⁴⁰ Medico-legal autopsies often suggested cranio-cerebral trauma as an immediate cause of death due to blunt force.⁴⁰ Post-mortem provides evidence that the head is the most common part attacked with blunt instruments since it provides the large area for the assault⁴¹ and torso also another commonly attacked part with blunt instruments since it also provides largest area for the attack. However, researchers found that head trauma sustains the most important fatal injury.⁴²

In murder involving children as victims, beating made up the majority of fatal mechanical injuries in blunt force trauma⁴⁰ due to its immediate availability at a particular time of moment. Children's death due to physical abuse is characterised by repeated beatings for a long period of time, causing severe blunt trauma that may further cause bruises, fractures, ruptures of internal organs and life-threatening bleedings.⁴² Child murders have also been reported in the Malaysian media.⁴³⁻⁴⁴

Another common method of murder is asphyxiation. Asphyxial deaths can be in such manner as strangulation, drowning or hanging.⁴⁵⁻⁴⁶ In East Delhi, out of 8385 forensic autopsies, 98 cases were documented as strangulation deaths and most of the strangulation deaths were carried out by using a ligature or manually with fractures of neck bones and cartilages were noted in 80% cases.⁴⁶ The retrospective analysis of the forensic autopsy records also revealed that ligating materials were still intact around neck region in 40% cases.⁴⁶

While manual asphyxia involves the use of bare hands, Demirci *et al.*⁴⁷ found a widespread use of clotheslines in asphyxial deaths using ligature due to its easy availability. Other materials that have been documented are scarfs, hose pipes, electric cables, package fibers, ropes, pantyhose and belts to apply pressure to the neck.⁴⁷ A lot of force is required to asphyxiate a conscious adult person, and therefore, ligature strangulation is more preferable.⁴⁶ This has been found to be especially common when the assailants are at a disadvantage in terms of physical strength. This could explain the dominance of males as victims in homicidal asphyxia.^{46, 48-50} Nonetheless an empirical study by Glass *et al.*⁵¹ recognised strangulation as an important risk factor for female homicide.

A retrospective study in Turkey focusing on fire-related fatalities reported 9.7% of fire-homicidal death occurrences which were either arson-related (1.1%), traumatic reasons (7.8%)

or unknown (0.8%).⁵² Homicidal burnings are most commonly reported in India or South Africa⁵³⁻⁵⁴ but comparatively rare in Europe, United States and Japan.⁵⁵⁻⁵⁷ Particularly, in India, spouse killings are often fire-related due to dowry harassment.⁵⁸

This method of killing is usually disguised as kitchen accidents related to the use of kerosene and other flaming agents as well as 'banking on' the flammable properties of garments worn and suicides.⁵⁹ A large proportion of female victims were later revealed as resulting from unnatural death due to burn⁶⁰ injuries sustained from kitchen accidents⁶¹⁻⁶², self-immolation⁶³ and domestic violence.⁶¹ However, most of the arsonist acts were post-mortem following homicides or other crimes. Here, murdered victims were burnt by the assailants in order to prevent recognition of the corpse and to cover up a homicidal action.⁶⁴

Choice of weapon

Studies on the choice of weapon prior to murder are increasingly becoming a focus in the investigative sciences, especially when researchers aim to understand how murder was committed. By definition, Brennan and Moore⁶⁵ referred a weapon as a tool that is designed or adapted to cause physical harm. In research on violence, weapon used in crimes have been an important focal point to address violent and aggressive behavior. A review of the literature categorizes weapons as follows: a) unarmed (e.g., hands, fists, or feet), b) blunt objects - which includes anything that can be used as a club, c) sharp objects - which includes items ranging from actual knives to machetes, sickles, chainsaws, ice picks and broken bottles and finally, and d) firearms.

Most researches address the offender demographics in relation to weapon selection. For instance, Gilliland, Spence, and Spence⁶⁶ reported male-perpetrators in Eastern North Carolina were more likely to engage with firearms compared to women in spousal homicide; 72.0% and 50.0% respectively. However, Biggers⁶⁸ claimed that guns were considered safe weapons by the offenders including female offenders since the attack and defense could be made from a distance. Given the lesser physical strength of women, this puts the offenders at a complete disadvantage, especially during physical confrontation with the husband.⁶⁷ By relying on a knife or machete during an attack towards the husband or male partner, a female perpetrator claimed that there was a greater possibility that the weapon will be

wrested away from her during the hand-to-hand confrontation.⁶⁷

The choice of intended weaponry also depends on its availability. For an instance, homicide by firearm is more frequent in countries where it is easy to obtain them legally, such as the United States. Compared to the United States, murder rates in countries where firearms ownership is legally restricted are relatively low. For example, more than one third of murder in USA⁶⁹ and Italy⁷⁰ were committed using handguns.

In other studies, researchers have suggested that the environmental context may influence the weapon of choice in homicides. In Malaysia, homicides were more likely to be carried out by using a sharp cutting weapon such as parangs, knives, sickles and daggers^{26,28-29} while blunt objects were commonly used as weapons in homicide cases in Penang.²⁷ Murders in Finland were typically perpetrated by drunken men with a history of violent crime, demonstrated knife as the choice of weapon.⁷¹⁻⁷² Comparatively, in New Zealand, blunt and sharp force trauma is the most common method of killing involving both stabbing and cutting injuries.⁷³ In summary, it appears that instruments which are widely available as well as normative patterns influences the type of weapon used in homicide.⁷⁴

However, homicide studies focusing on abnormal perpetrators had established the relationship between psychopathology and weapon choice. An empirical study on Scottish offenders supported the relationship between psychopathy and weapon use.⁷⁵ Mental disorders such as delusional disorder and depression were also found to be predictive in the choice of weapon, especially when the disorder is characterised by non-bizarre delusion and no depatterning of behavior.⁷⁶

Researchers reported a strong correlation between delusional disorder and the use of sharp instruments with high number of strikes and blow mostly targeted at a vital zone.⁷⁶ The instruments chosen were deliberate and showed a strong determination or aforethought to kill, particularly in cases involving infidelity and persecutory delusion. Depressive disorder demonstrated a strong correlation with asphyxia involving young mothers as the main perpetrators and young children as victims.⁷⁶ These young mothers usually select "softer" weapons, such as pillows; to kill their children in a "soft" manner without making any mess and without making the victim suffer too much.⁷⁶

Given the characteristics of a typical

depressive disorder, death due to the feeling of “sadness” is also seen as a solution to suffering and as an escape route.⁷⁶ Psychotic offenders were found to use sharp weapons more frequently since these instruments were immediately available at the particular moment of killing with most injuries inflicted onto the face of the victims.⁷⁷ Some researchers hypothesised that schizophrenic murderers might find their victims’ face threatening due to impaired processing of facial expressions of the psychotic individuals.⁷⁸⁻⁷⁹ Their acts are impulsive, often resulted from hallucinations and delusions at the time of the offense.⁷⁷

Targeted body parts of murder victims

Focusing on fatal sharp force trauma, some researchers hypothesised that one’s motivation for killing can be reflected through the numbers of injuries found on victims’ bodies.^{41,80} From these researchers’ observation, it was reported that the more injuries found in victims are related to intentional killing or as an expression of anger towards the victims.^{41,80} In respect to this, thorax, neck, head, trunk and limbs are the most common site for injuries for intentional killing or due to expression of anger.⁸¹⁻⁸³

In Malaysia, majority of murderers (60.6%) targeted the weapon towards multiple body parts; head (14.1%) was the most common body part targeted.²⁸ The same study explained that involvement of multiple body parts may due to several factors. First, retaliation and struggles between offender and victim often resulted in multiple injuries on victims. Secondly, the multiple targeted body parts may be considered as ‘over kill’ injuries. It is likely that murderers wanted to ensure the death of his victim as prior wounding may be perceived as unlikely to result in death. As a third reason, multiple body parts were prevalent in abuse-cum-murder and expressive murders which were provoked by arguments and brawls. Multiple targeted body parts were purposive to cause constant or lingering pain.²⁸

On another viewpoint of angle, the site of injury is somehow related to the closeness of the relationship between the assailants and victims.⁴¹ Researchers discovered that when the victims have a personal relationship with the perpetrators, the presence of injuries was more readily observed in head, face and neck, especially in intimate partner homicide cases.⁴¹ The site of injuries from sharp force trauma has further suggested itself as an indicator to

distinguish if the victim is a stranger to the offender.⁴¹

Place and time settings of murder

In this study, the settings of murder referred to location where the murder had taken place as well the time of incidents. Information about place and time settings is vital as they can help in providing the pertinent information of murder and directs the murder investigation. The following section briefly describes a review on the location and time of murder.

Place setting, referring to where the murder has taken place; is particularly important in criminal investigations.⁸⁴ For example, in Taiwan, Cao, Hou, and Huang⁸⁵ asserted that the place setting of a crime is an important variable that may vary based on the murder relationship type and as such has implications on the pool of suspects.

According to Routine Activity Theory (RAT)⁸⁶ and Social Disorganisation Theory (SDT)⁸⁷, instrumental homicides (between strangers) are more likely to take place outside the home. Meanwhile, Block²⁰ found that impulsive homicides among primary relationships are more likely to happen at home. Decker⁸⁸ had correlated the crime location with the intensity of victim-offender relationship and found that the greater the intensity of the relationship (from strangers to relatives), the higher the tendency for a homicide to occur at home.

Cumulatively, the review generates information that expressive homicides are more common or prone to happen at homes or in cars, whereas instrumental homicide (between stranger and acquaintances) usually takes place in public places such as the streets.⁸⁵ Hence, Cao, Hou, and Huang⁸⁵ concluded that location plays an important role in determining the type of homicide. They delivered their findings by stating that those committed outdoors, reduce the probability of expressive homicide but increases the probability of killing between strangers (instrumental homicides). In addition, place setting seems to be very important especially when urban and rural areas were involved and compared.^{84,89} Along this line of thought, researchers discovered that when murder took place in rural areas, victims were most commonly among intimate and family members of the perpetrators, while in urban areas, strangers were more commonly victimised.

Previous studies of spousal killings⁹⁰⁻⁹² indicated that spousal homicide victims and their

attackers typically shared a common residence at the time of the lethal incident. In addition, this residence was usually the physical setting or location for the homicide. For example, over 91.0% of female-perpetrated spousal homicides in Goetting's⁹¹ study occurred in private residences, which were usually the domicile shared by the assailant and the victim.

With reference to the spatial location of spousal homicides in Ghana, Adinkrah⁹³ provided evidence that wife killings and husband killings were remarkably similar in that they typically occurred in villages and small towns. Salfati and Dupont⁹⁴ showed that the location at which the murder victim was found was most likely to be the victim's home (59.0%), whether a house or an apartment building. The second most frequent location was the offender's home (36.0%). In Salfati and Dupont⁹⁴ study, 28.0% of victims were found in another location, usually a public area, such as in a bar, in a parking lot, on the street, in a hospital, in a motor vehicle, or on a public transport. In 16.0% of the cases, the victim was found outside a building.⁹⁴

Other than place setting, the time of murder is another important construct in murder investigations. While forensic pathologists are interested with time of death, criminologists are interested with the time the murder took place. This is as a step to identify the peak time for murder to occur and investigate whether time of incidents are associated with other important constructs of murder.

Unfortunately, few criminological studies have acknowledged the importance of time of homicide incidents as part of their study. Regarding time settings of murder, details about the exact time of murder incidents were not published in many cases.^{2,26,72,89,95} What is known is that the majority of homicides in India occur during late evenings and at night.⁸² In Salfati and Dupont's⁹⁴ study, 69.0% of the victims were killed while it was dark outside. However, this observation was in contrast with Sri Lanka, where the majority of homicides took place during the daytime.²

A Malaysian study based on information from newspaper indicated that the majority of Malaysian murders took place during late evening or night time.²⁹ This finding is consistent with the time settings of murder in India, where it was identified that the majority of murder occur during late evenings and at night.⁸² However, this time setting is in contrast with Sri Lanka, where the majority of murder took place during the daytime.²

Concealment of murder victims

Another focus of this current review is on the concealment of murder victims as it offers insights into the cognitive level (*mens rea*) and planning element (*actus reus*) of the murderer. Murder concealment is a term that is used to describe the act or attempt to obliterate the fact that a murder has been committed. In this respect, the main purposes of the murderers to conceal the murder are to destroy the valuable forensic evidence and/or prevent the identification of the murdered victims.

In Malaysia, the majority (78.9%) of murderers reported that they did not conceal their crime or murdered victim as the bodies were left at the crime scene. However, few murderers agreed that they concealed their victim for the purpose of crime concealment and to prevent recognition of the corpse. Among them, it appears that concealing murder by dumping or postmortem burning were the most preferred method. The burnt corpses are then often discovered in remote areas like abandoned places (for example: bankrupt factories, abandoned housing projects and derelict buildings) or in unfamiliar outdoor places (for example: cemeteries, isolated farms, and oil palm plantations).²⁹

The literature indicates that various methods have been employed by the murderers to achieve such goals. Murder concealment has become a common practice worldwide. It was suggested that, burying, postmortem burning, and dumping corpses into the water have been recognized as frequent methods to cover the criminal incidents such as murder.⁶⁴

Arson, which is using fire; is defined as the intentional destruction of property for unlawful purposes.⁹⁶ The commission of arson for the purpose of crime concealment, in this instance, murder concealment; has become a very common method among the murderers. Specifically, arson which was committed to conceal murder is identified as 'postmortem burning'. By doing so, the murderers believed that important traceable evidence can be destroyed.⁴

When arson is the mechanism utilised, combustible materials such as kerosene seem to be the frequently used accelerant agents due to its easy availability.⁶⁴ Accelerant which is defined as any fuel (solid, liquid, or gas) is used to initiate or increase the intensity or spread of fire during the commission of crime concealment. In most instances, criminals use abundant liquid accelerant as an attempt to eradicate all the traces of evidence and also prevent the identification of the victim's identity.⁹⁷

Other than arson, a small percentage of murderers conceal their crimes with the use of explosives. In general, explosives are used for a variety of purposes including usage in mining, quarrying, and demolition for the purpose of construction.⁹⁸ However, such explosive is widely misused for illegal purposes including concealment of crime, despite the noise it makes.

As previously mentioned, the goal for such bombing act is to destroy the valuable forensic evidence and the victim itself. For such concealment, many types of explosives are used including homemade bombs, commercial explosives, and in some instances, military explosives. However, the use of such explosive depends on the knowledge to construct a bomb, accessibility, and availability of such explosive substances. In addition, thought must be made on where and when to set the explosives off. Such murders are characterized as organised and well-planned.

Another concealment method is soil burial. According to Prangnell and McGowan⁹⁹, soil burial is a common method of disposal of human remains either legitimately in the case of publicly recorded deaths, or clandestinely as a consequence of criminal activity. The main purpose of the illegal burial is for immediate disposal of the corpse. For the purpose of investigation, ground penetrating radar is now employed in crime investigation to locate clandestine burials of homicidal victims.¹⁰⁰⁻¹⁰²

In general, the burial of murdered victims takes place in remote and isolated areas including plantation areas, estate, landslide, cemetery, caves, and farms. In most instances, the discovery of the illegal burial is noticed by private citizens such as farmer, hikers, or hunters who unexpectedly discover the remaining bones. Since most of the evidence is destroyed by time, climatic changes, animals and microbial activity, and other environmental factors, the identification of skeletonised remains are usually done by the forensic anthropologist and forensic biologists.

Concerning the role of substance use, alcohol has been claimed to play an important role in the commission of murder concealment.⁹⁷ It was suggested that consumption of alcohol and recreational drugs lessens the inhibitions of the fire setter and enables the perpetration of concealment. Although many reasons have been put forth to explain the act of murder concealment, the psychological functioning which instigate the act of concealment has been

largely ignored, perhaps due to the difficulty in obtaining access to incarcerated murderers and their unwillingness to divulge such information.

CONCLUSION

Murder is perceived as the most ultimate personal crime. In fact, it is the most compelling one too. The present review emphasizes on the mechanical profiles of murder and murderers. It is very important for us to understand the nature and spirals of mechanical aspects of murder since it provides details pertaining to the circumstances surrounding the event. In other words, such aspects enable us to understand the actions behind the scene. Therefore, such aspects cannot be overlooked by the public, investigators, researchers and other key personnel involved in unraveling such criminal events since it provides a pool of information to the nature and extent of every murder.

Moreover, in-depth understanding of such mechanical aspects is crucial, especially in offering the criminal justice figures a better understanding regarding murder and murderers. It is anticipated that through this review, it offers an opportunity to the public to improvise their crime prevention knowledge, vital for future crime prevention. Such knowledge of crime prevention acts as a platform to create and sustain a violent-free nation.

ACKNOWLEDGEMENT

The authors would like to express their sincerest gratitude and thanks to Universiti Kebangsaan Malaysia and Universiti Sains Malaysia. Funding has provided by the UKM GGPM 2016-071. Authors also thanked Dr. Vikneswaran Chendirasagaram and Dr. Shalene Palansamy for their technical assistance.

REFERENCES

1. Alvarez A, Bachman R. *Murder American Style*. Belmont, CA: Wadsworth; 2003.
2. Edirisinghe PA, Kitulwatte ID. Extreme violence homicide; an analysis of 265 cases from the offices of JMO Colombo and Ragama- A study from Sri Lanka. *Leg Med (Tokyo)*. 2009; 11(Suppl 1): 363-5.
3. Mohanty MK. Variants of homicide: A review. *J Clin Foren Med*. 2004; 11: 214-8.
4. Geberth VJ. *Practical Homicide Investigation: Tactics, Procedures, and Techniques*. 4th ed. CRC Press; 1996.
5. Webster J, Watson RT. Analyzing the past to prepare for the future: Writing a literature review. *MIS Quarterly*. 2002; 26(2): xiii-xxiii.

6. Wilczynski A. Child Homicide. London: Greenwich Medical Media; 1997.
7. Morral P. Murder and society. John Wiley & Sons Ltd; 2006.
8. Douglas JE, Ressler RK, Burgess AW, Hartman CR. Criminal profiling from crime scene analysis. *Behav Sci Law*. 1992; 4: 401-21.
9. Block R, Block C. Homicide syndromes and vulnerability: Violence in Chicago's community areas over 25 years. *Studies on Crime and Crime Prevention*. 1992; 61-87.
10. Decker SH. Deviant homicide: A new look at the role of motives and victim-offender relationships. *Homicide Studies*. 1996; 33: 427-49.
11. Block R, Zimring F. "Homicide in Chicago, 1965-1970". *J Res Crime Delinq*. 1973; 10: 1-12.
12. Berkowitz L. "Some Varieties of Human Aggression: Criminal Violence as Coercion, Rule-following, Impression Management and Impulsive Behaviour." Pp. 87-103 in *Violent Transactions*, edited by Campbell, A and Gibbs, J. New York: Basil Blackwell; 1986.
13. Riedel M. Symposium: Stranger violence: Perspectives, issues and problems. *J Crim Law & Criminology*. 1987; 78: 223-58.
14. Parker RN, Smith MD. Deterrence, poverty and type of homicide. *Am J Sociol*. 1979; 85: 614-24.
15. Smith MD, Parker RN. Type of homicide and variation in regional rates. *Soc Forces*. 1980; 59: 136-46.
16. Riedel M, Przybylski R. "Stranger murders and assault: A study of a neglected form of stranger violence." Pp.359-382 in *Homicide: The victim/offender connection*, edited by Anna Victoria Wilson, Cincinnati, OH: Anderson; 1993.
17. Rojek D, Williams J. "Interracial vs. intraracial offences in terms of the victim/ offender relationship." Pp. 249-266 in *Homicide: The victim/offender connection*, edited by Anna Victoria Wilson, Cincinnati, OH: Anderson; 1993.
18. Loftin C. Assaultive violence as a contagious social process. *Bull N Y Acad Med*. 1986; 62: 550-5.
19. Maxfield M. Circumstances in Supplementary Homicide Reports: Variety and Validity. *Criminology*. 1989; 27: 671-95.
20. Block R. Victim-offender dynamics in violent crime. *J Crim Law & Criminology*. 1981; 72: 743-61.
21. Daly M, Wilson M. Homicide and kinship. *Am Anthropol*. 1982; 84: 372-8.
22. Cook PJ. Robbery violence. *J Crim Law & Criminology*. 1987; 78: 357-76.
23. Smith TW. 1999 National gun policy survey of the national opinion research center: Research findings. Chicago, IL: National Opinion Research Center, University of Chicago; 2000.
24. Hepburn LM, Hemenway D. Firearm availability and homicide: A review of the literature. *Aggression and Violent Behavior*. 2004; 9: 417-40.
25. Gruenewald JA, Pridemore WA. Stability and change in homicide victim, offender, and event characteristics in Chicago, 1900 and 2000. *Homicide Studies*. 2009; 13: 355.
26. Kumar V, Li AK, Zainal AZ, Lee DA, Salleh SA. A study of homicidal death in medico legal autopsies at UMMC, Kuala Lumpur. *J Clin Foren Med*. 2010; 12: 254-7.
27. Bhupinder S, Kumara TK, Syed AM. Pattern of homicidal deaths autopsied at Penang Hospital, Malaysia, 2007-2009: A preliminary study. *Malaysian J Pathol*. 2010; 32(2): 81-6.
28. Kamaluddin M, Shariff NS, Nurfarliza S, Othman A, Ismail KH, Mat Saat GA. Psychological traits underlying different killing methods among Malaysian male murderers. *Malaysian J Pathol*. 2014; 36(1): 41-50
29. Kamaluddin M, Shariff NS, Mat Saat GA. Epidemiological profiles of murders and murder victims in Peninsular Malaysia from 2007 to 2011 a reported by a newspaper. *IOSR J Humanities and Soc Sci*. 2014; 19 (7): 73-81.
30. Ghangale AL, Dhawane SG, Mukherjee AA. Study of homicidal deaths at Indira Gandhi Medical College, Nagpur. *J Forensic Med Toxicol*. 2003; 20: 47-51.
31. Coelho L, Ribeiro T, Dias R, Santos A, Magalhães T. Elder homicide in the North of Portugal. *J Forensic Leg Med*. 2010; 17: 383-7.
32. Vij A, Anand M, Ritesh G, Menezes, Tanuj K, Prateek R. A retrospective review of homicides in Mangalore, South India. *J Forensic Leg Med*. 2010; 17: 312-5.
33. Wiebe DJ. Homicide and suicide risk associated with firearms in the home: A national case control study. *Ann Emerg Med*. 2003; 41: 771-82.
34. Beech A, Fisher D, Ward T. Sexual murderers' implicit theories. *J Interpers Violence*. 2005; 20: 1366-89.
35. Dobash RP, Dobash RE, Cavanagh K, Smith D, Medina-Ariza J. Onset of offending and life course among men convicted of murder. *Homicide Studies*. 2007; 11: 243-371.
36. Stark E. *Coercive control: Entrapment of women in personal life*. New York, NY: Oxford University Press; 2007.
37. Johnson MP. *A typology of domestic violence: Intimate terrorism, violent resistance and situational couple violence*. Lebanon, NH: Northeastern University Press; 2008.
38. Kasim MS, Cheah I, Shafie HM. Childhood deaths from physical abuse. *Child abuse & neglect*. 1995; 19: 847-54.
39. Rouge-Maillart C, Jousset N, Gaudin A, Bouju B, Penneau M. Women who kill their children. *Am J Forensic Med Pathol*. 2005; 26: 320-6.
40. Baralic I, Savic S, Alempijevic DM, Jecmenica DS, Sbutega-Milosevic G, Obradovi M. Child Homicide on the Territory of Belgrade. *Child Abuse Neglect*. 2010; 34: 935-942.
41. Au KI, Beh SL. Injury patterns of sharp instrument homicides in Hong Kong. *Forensic Sci Int*. 2011; 204: 201-204.
42. Jenny C. Committee on child abuse and neglect, American Academy of Pediatrics: Recognizing and responding to medical neglect. *Pediatrics*. 2007; 120: 1385-1389.

43. The Star Online. Maid Gets 20 Years' Jail for Attempted Murder of Baby. Retrieved from <http://www.thestar.com.my/News/Nation/2013/02/19/Maid-gets-20-years-jail-for-attempted-murder-of-baby/>. 2013; February 19.
44. New Straits Times. Mum charged with murder of 5-year-old daughter. 2013; August 27.
45. Sharma GASK, Murty OP, Dogra TD. Study of Ligature Marks in Asphyxial Deaths of Hanging and Strangulation. *Int J Med Toxicol Legal Med.* 2002; 4: 21-4.
46. Verma SK, Lal S. Strangulation deaths during 1993–2002 in East Delhi (India). *Leg Med (Tokyo).* 2006; 8: 1–4.
47. Demirci S, Dogan KH, Erkol Z, Gunaydin G. Ligature strangulation deaths in the province of Konya (Turkey). *J Forensic Leg Med.* 2009; 16: 248–52.
48. Murty OP, Agnihotri AK. Homicidal Deaths in South Delhi. *J Indian Acad Forensic Med.* 2000; 22(1): 9–11.
49. Jani CB, Gupta BD. An autopsy study of parameters influencing injury to osteocartilagenous structures of neck in hanging. *Int J Med Toxicol Leg Med.* 2002; 5(1): 4–7.
50. Sinha US, Kapoor AK, Pandey SK. Pattern of homicidal deaths in SKN Hospitals mortuary at Allahabad. *J Forensic Med Toxicol.* 2003; 20(2): 33-6.
51. Glass N, Laughon L, Campbell J, *et al.* Non-fatal strangulation is an important risk factor for homicide of women. *J Emerg Med.* 2008; 35 (3): 329-35.
52. Buyuk Y, Kocak U. Fire-related fatalities in Istanbul, Turkey: Analysis of 320 forensic autopsy cases. *J Forensic Leg Med.* 2009; 16: 449-54.
53. Gaur JR, Sangwan SK, Singh I, Thukral K. Evaluation of physical evidence in a burn base. *Med Sci Law.* 1993; 33: 75-8.
54. Lerer LB. Homicide-associated burning in Cape Town, South Africa. *Am J Forensic Med Pathol.* 1994; 15: 233-47.
55. Copeland AR. Accidental fire deaths. The 5-year Metropolitan Dade County experience from 1979 until 1983. *Z Rechtsmed.* 1985; 94: 71-9.
56. Frazier HC. She went up in flames: Evidence of a burn homicide. *Med Sci Law.* 1987; 6: 69-78.
57. Iwase H, Yamada Y, Ootani S, *et al.* Evidence for an antemortem injury of a burned head dissected from a burned body. *Forensic Sci Intern.* 1998; 94: 9-14.
58. Babu GR, Babu BV. Dowry deaths: a neglected public health issue in India. *Int Health.* 2011; 3: 35-43.
59. Sanghavi P, Bhalla K, Das V. Fire-related deaths in India in 2001: A retrospective analysis of data. *Lancet.* 2009; 373: 1282–8.
60. Singh D, Singh A, Sharma AK, Sodhi L. Burn mortality in Chandigarh zone: 25 years autopsy experience from a tertiary care hospital of India. *Burns.* 1998; 24: 150-6.
61. Gupta RK, Srivastava AK. Study of fatal burns cases in Kanpur (India). *Forensic Sci Int.* 1988; 37: 81-9.
62. Jayaraman V, Ramakrishnan KM, Davies MR. Burns in Madras, India: an analysis of 1368 patients in 1 year. *Burns.* 1993; 19: 339-44.
63. Gajalakshmi V, Peto R. Suicide rates in rural Tamil Nadu, South India: Verbal autopsy of 39000 deaths in 1997-98. *Int J Epidemiol.* 2007; 36: 203-7.
64. Tümer AR, Akçan R, Karacaoglu E, *et al.* Postmortem burning of the corpses following homicide. *J Forensic Leg Med.* 2012; 19 (4): 223-8.
65. Brennan IR, Moore SC. Weapons and violence: A review of theory and research. *Aggression and Violent Behavior.* 2009; 14: 215-25.
66. Gilliland MGF, Spence PR, Spence RL. Patterns of lethal domestic violence in Eastern North Carolina. *Proceedings of the American Academy of Forensic Sciences, Seattle, WA, 7, 210.* 2001.
67. Adinkrah M. Female-perpetrated spousal homicides: The case of Fiji. *J Criminal Justice.* 2000; 28: 151-61.
68. Biggers TA. Death by murder: A study of women murderers. *Death Ed.* 1979; 3: 1-9.
69. Agnes F. Marital murder -- the Indian reality. *Health Millions.* 1993; 18-21.
70. Preti A, Miotto P. Death by homicide in Italy, 1980–94: Age and gender differences among victims. *Med Sci Law.* 2000; 40: 233-40.
71. Kivivouri J. Homicide-Suicide in Finland, 2002–2006. *European Society of Criminology, Bologna; 2007.*
72. Wahlsten P, Koiranen V, Saukko P. Survey of medico-legal investigation of homicides in the city of Turku, Finland. *J Clin Forensic Med.* 2007; 14(5): 243-52.
73. Lo M, Jane CV, Koelmeyer TD. Homicide in Auckland, New Zealand, A 14 Year Study. *Am J Forensic Med Pathol.* 1992; 13: 44-9.
74. Vougiouklakis T, Tsiligianni C. Forensic and criminologic aspects of murder in North-West (Epirus), Greece. *J Clin Foren Med.* 2006; 13: 316–320.
75. Michie C, Cooke DJ. The structure of violent behavior: A hierarchical model. *Criminal Justice & Behav.* 2006; 33(6): 706-37.
76. Catanesi R, Carabellese F, Troccoli G, *et al.* Psychopathology and weapon choice: A study of 103 perpetrators of homicide or attempted homicide. *Forensic Sci Int.* 2011; 209: 149-53.
77. Hakkanen H, Laajasalo T. Homicide crime scene behaviors in a Finnish sample of mentally ill offender. *Homicide Studies.* 2006; 10: 33.
78. Mandal MK, Pandey R, Prasad AB. Facial expressions of emotions and schizophrenia: A review. *Schizophr Bull.* 1998; 24: 399-412.
79. Manor BR, Gordon E, Williams LM, *et al.* Eye Movements reflect impaired face processing in patients with schizophrenia. *Biol Psychiatry.* 1999; 46: 963-9.
80. Ong BB. The Pattern of Homicidal Slash/Chop Injuries: A 10-year retrospective study in University Hospital Kuala Lumpur. *J Clin Forensic Med.* 1999; 6: 24-9.
81. Gill JR, Catanese C. Sharp injury fatalities in New York City. *J Forensic Sci.* 2002; 47: 554-7.
82. Mohanty MK, Kumar TSM, Mohanram VP. Victims

- of homicidal deaths: An analysis of variables. *J Clin Forensic Med.* 2005; 12: 302-4.
83. Ambade VN, Godbole HV. Comparison of wound patterns in homicide by sharp and blunt force. *Forensic Sci Int.* 2006; 156: 166-70.
 84. Gallup-Black A. Twenty years of rural and urban trends in family and intimate partner homicide. *Homicide Studies.* 2005; 9: 149-173.
 85. Cao L, Hou C, Huang B. Correlates of the victim-offender relationship in homicide. *Int J Offender Ther Comp Criminol.* 2008; 52 (6): 658-72.
 86. Messner SF, Tardiff K. The social ecology of urban homicide: An application of the "routine activities" approach. *Criminology.* 1985; 23: 241-67.
 87. Sampson RJ. Urban black violence: the effect of male joblessness and family disruption. *Am J Sociol.* 1987; 93: 348-82.
 88. Decker SH. Exploring victim-offender relationships in homicide: The role of individual and event characteristics. *Justice Quarterly.* 1993; 10: 585-612.
 89. Shai D. Homicide in the high north: Alaska, 1999-2006. *Homicide Studies.* 2010; 14: 132-3.
 90. Bernard G, Vera H, Vera M, Newman G. Till death do us part: A study of spouse murder. *Bull Am Acad Psychiatry Law.* 1982; 10: 271-80.
 91. Goetting A. Patterns of marital homicide: A comparison of husbands and wives. *J Comparative Family Studies.* 1989; 20: 341-54.
 92. Browne A, Williams KR. Exploring the effect of resource availability and the likelihood of female-perpetrated homicides. *Law & Society Review.* 1995; 23: 75-94.
 93. Adinkrah M. Spousal homicides in contemporary Ghana. *J Criminal Justice.* 2008; 36: 209-16.
 94. Salfati CG, Dupont F. Canadian homicide: An investigation of crime-scene actions. *Homicide Studies.* 2006; 10: 118-39.
 95. Saint-Martin P, Bouyssy M, Bathellier S, Sarraj S, O'Byrne P. Homicide in tours (Indre-et-Loire, France): a four-year review. *J Clin Forensic Med.* 2006; 13: 331-4.
 96. Kolko DJ. *Handbook on Fire setting in Children and Youth.* San Diego: CA, Academic Press; 2002.
 97. Holmes RM, Holmes ST. *Profiling violent crimes: An investigative tool.* 3rd ed. Sage Publications, Inc; 2002.
 98. Delvin S. *Explosives.* New Delhi, India: Sarup & Sons; 2000.
 99. Prangnell J, McGowan G. Soil temperature calculation for burial site analysis. *Forensic Sci Int.* 2009; 191: 104-9.
 100. Nobes DC. The search for "Yvonne": A case example of the delineation of a grave using near- surface geophysical methods. *J Forensic Sci.* 2000; 45: 715-21.
 101. Davenport GC. Remote sensing applications in forensic investigations. *Historical Archaeology.* 2001; 35: 87-100.
 102. Schultz JJ. Using ground-penetrating radar to locate clandestine graves of homicide victims: forming forensic archaeology partnerships with law enforcement. *Homicide Studies.* 2007; 11: 15-29.